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Part I: Overview of Business

The University of Iowa is one of the nation's premier public research universities with 33,334 students from 114 countries and all 50 states. Founded in 1847, it is the state's oldest institution of higher education and is located alongside the picturesque Iowa River in Iowa City.

Part II: Job Specifics

The Leddy group's research efforts span a few different areas but all share a foundation in electroanalytical chemistry and spin polarization. Specific areas of research are kinetic studies of magnetically-modified composite materials processes, characterization of mass transport in films, lanthanide electrochemistry, and thin layer sonoelectrochemistry. In addition, they model these systems mathematically and with computer simulations.

Part III: Introduce the Problem

The antioxidant astaxanthin is produced by certain species of algae under various conditions (usually some form of stress). It has great value as a nutraceutical if produced in controlled conditions. Electrostimulation has been demonstrated by this lab to increase the production of ammonia by blue-green algae. Could this process be used to induce and/or enhance the production of astaxanthin in the algae *Parachlorella*?

Part IV: Background

Parachlorella is a species of algae that typically is not used for astaxanthin production, but has been shown to be capable and has traits desirable for intense cultivation (e.g. high pop. density). Student research currently being conducted in collaboration with Iowa State University seeks to create mutants that produce astaxanthin through UV radiation. This problem-based learning opportunity would seek to use electrostimulation to accomplish this task.

Part V: Business Solution

Since this is original research, the host currently has no solution to this problem. The host will provide ongoing support (both physical and technical). This is exactly the kind of real world, problem-based learning opportunity students need. Additionally, it exposes them to the field of chemistry and the University of Iowa.

Part VI: Student Solutions

While existing research has shown that electrostimulation can increase the production of similar pigments in other algae species, it is unclear whether students will be able to induce astaxanthin production in *Parachlorella*. The real learning opportunities exist, however, in the actual doing of the science; not necessarily in successful results.